# OUTREACH

UNIMAS RESEARCH BULLETIN | Vol.3 No.2 ISSN : 1985-2053

Pilot Plant for Biofuel from Sago Waste

Pangaea Cyberspace Playground for Children across the Globe

Biodiversity of the Kelabit Highlands of Sarawak

The Mangrove Forests of Sarawak

Modelling Large Scale Greywater Recycling

# Fast Facts on UNIMAS

| | | |
|---|---|---|
| **Date established (incorporated)** | **24 December 1992** | |
| **Campus Site** | **Kota Samarahan, Sarawak, Malaysia (about 25 km from the city of Kuching, the capital city of Sarawak)** | |
| **Present Vice Chancellor** | **Prof Dr Khairuddin Ab Hamid** | |
| **Student Enrolment (Academic Session 2009/2010)** | Undergraduate | 6,500 |
| | Postgraduate | 647 |
| | **Total** | **7,147** |
| **Full time staff** | Academic | 663 |
| | Management | 131 |
| | Support | 1001 |
| | **Total** | **1795** |

**Faculties**
Faculty of Applied and Creative Arts (FACA)
Faculty of Cognitive Sciences and Human Development (FCSHD)
Faculty of Computer Science and Information Technology (FCSIT)
Faculty of Economics and Business (FEB)
Faculty of Engineering (FE)
Faculty of Medicine and Health Sciences (FMHS)
Faculty of Resource Science and Technology (FRST)
Faculty of Social Sciences (FSS)

**Institutes**
Institute of Biodiversity and Environmental Conservation (IBEC)
Institute of East Asian Studies (IEAS)
Institute of Health and Community Medicine (IHCM)

**Centres**
Centre for Language Studies (CLS)
Centre for Academic Information Services (CAIS)
Centre for Student Development (CSD)
Centre for Technology Transfer and Consultancy (CTTC)
Centre for Information and Communication Technology Services (CICTS)
Centre for Applied Learning and Multimedia (CALM)
Research and Innovation Management Centre (RIMC)
Centre for Graduate Studies (CGS)

**Centres of Excellence**
Malaria Research Centre
Centre for Water Research
Centre for Rural Informatics
Centre for Image Analysis and Spatial Technologies
Centre for Renewable Energy
Centre for Semantic Technology and Augmented Reality

**International Linkages**
54 International Partners Worldwide

**Centre for Academic Information Services**

| | |
|---|---|
| Volume of Books | 121,951 |
| Sets of Media Materials | 8,036 |
| Journal Titles (Print and Electronic) | 18,458 |




**Cover Design**




ISSN 1985-2053
9 771985 205001

# Introduction to this Issue

Earlier this year, UNIMAS was selected as the first site in South East Asia to collaborate in the international PANGEA project, an ICT based programme that allows children around the globe to interact with each other spontaneously. Also, an MoU for the first biofuel pilot plant that utilises sago waste was signed and the construction of the pilot plant in UNIMAS campus has started.

In our ongoing effort to highlight and preserve the vast richness of our biodiversity, an expedition to the Kelabit Highlands was initiated. We also put special focus on the wetlands as these areas undoubtedly have an abundant array of wildlife that feed and shelter many. And as our population increases, so do our demand on the natural resources that support our basic needs, example water. Here, we look at the possibility of an environmentally friendly large scale greywater recycling for Kuching, Sarawak.

We continue to expand our network, both at the national and international levels. Various research were instigated with the industries and private companies, and creative and innovative solutions were proposed and experimented for the benefit of the country and the community.

It's mid 2009, and it has been interesting so far. I hope that the rest of this year will bring us many exciting outcomes.

Prof Dr Peter Songan

## TABLE OF CONTENTS

# RESEARCH NEWS

## Pangaea Cyberspace Playground for Children across the Globe

In December 2008, Universiti Malaysia Sarawak (UNIMAS) began collaboration with a non-profit organisation in Japan, Pangaea, to set up an ICT-based universal playground, where children could interact with other children from various countries around the world. The programme utilises ICT to connect multiple global locations, setting a platform for productive interaction among children, regardless of geographical distance.

On 25 July 2009, the first Pangaea@UNIMAS Activity Day was organised to allow a group of local children to interact with a group of 20 children in Kyoto, Japan. The event was officiated by Professor Peter Songan, Deputy Vice-Chancellor (Research and Innovation), Universiti Malaysia Sarawak. The webcam sessions offer real-time interaction between the children by networking multiple activity sites both locally and globally.

The Pangaea programme has been successfully implemented in various sites in Japan, Austria, Nairobi and Kenya. This is the first time it is introduced in South East Asia and UNIMAS is privileged to be selected as the first site in Malaysia to run this multi-cultural programme. The Pangaea@UNIMAS programme is financially supported by TTC Japan, NPO Pangaea Japan and CoERI, UNIMAS.

## MoA UNIMAS - Keringkam Group Sdn Bhd

UNIMAS, through SEBAYOR Holdings Sdn Bhd signed an MOA with Keringkam Group Sdn Bhd on 19 June 2009 at the Hilton Hotel, Kuching for the investigation of the medicinal properties of Jatropha curcas plants.

Present to witness the signing ceremony was the Hon Tuan Haji Fadillah Yusof, Deputy Minister of Ministry of Science, Technology and Innovations, Malaysia. The research will be headed by Dr Noorzaid Muhamad of the Faculty of Medicine and Health Sciences, UNIMAS.

# Pilot Plant for Biofuel from Sago Waste

The ground breaking ceremony for the construction of a full-scale pilot-plant (1000L or 1 ton/day) for the production of ethanol for fuel from sago biomass was held at UNIMAS on 3 July 2009. The ceremony was officiated by the Hon Tn Hj Fadillah Yusof, the Deputy Minister of the Ministry of Science, Technology and Innovation.

The ground breaking ceremony honoured an earlier MOA signed in January 2009 between UNIMAS and AARGYP SCIENTIFIC Sdn. Bhd. (AGS) of Kuching, Sarawak, as the industrial partner. The construction costs will be fully funded by Techno-Fund, a research grant awarded by the Ministry of Science, Technology and Innovation (MOSTI) to AGS in August 2007.

The realisation of the pilot-plant is an achievement accumulated over several years of research in utilization of sago starch, sago effluent and biomass by Prof. Dr. Kopli Bujang of UNIMAS, and Prof. Emeritus Dr. Ayaaki Ishizaki of NECFER, Japan. An MOU was signed earlier on 4 August, 2006 between UNIMAS and NECFER to enhance research in the specific field of biofuel from sago.

Among those present to witness the ground breaking ceremony were Prof Dr Khairuddin Hamid, the Vice Chancellor of UNIMAS, and Prof Dr Peter Songan, the Deputy Vice Chancellor for Research and Innovation of UNIMAS.

# Green Week 2009

Universiti Malaysia Sarawak (UNIMAS) organised a Green Week 2009 event which emphasised on green and renewable energy called Green Week 2009 from 15-19 June 2009. Green Week 2009 is jointly organised by the Faculty of Engineering and Faculty of Computer Science and Information Technology.

The two main centres of excellence are Centre of Excellence for Rural Informatics (CoERI) and Centre of Excellence for Renewable Energy aim to expose the community to the advantages of green energy and to promote the use of this energy in Malaysia. The targeted participants include officials from government departments, private and public sectors, researchers and also students. One seminar and two workshops focusing on Green Technology, Solar PV and Energy Efficiency were held during Green Week.


# UNIMAS Research on ABC Television

The discovery that monkey malaria parasites are causing human malaria in Malaysian Borneo was featured in a television documentary aired by Australian Broadcasting Corp on 2 April 2009. The documentary can be viewed on the Catalyst ABC website at: http://www.abc.net.au/catalyst/stories/2533454.htm. Extended interviews with Professors Balbir Singh and Janet Cox-Singh both of the Malaria Research Centre, UNIMAS are also available on the website at: http://www.abc.net.au/catalyst/extras/extra_videos/default.htm.

# UNIMAS' Journal with an Impact Factor

UNIMAS is now jointly hosting an international journal called Journal of Universal Computer Science, in collaboration with the Graz University of Technology. This is one of the largest online Computer Science journal covering all areas of Computer Science including inter-disciplinary areas such as e-Learning and Knowledge Management. This journal has an impact factor of 0.34 and is indexed by both ISI and SCOPUS. It has an editorial board with over 300 members. Please visit http://www.jucs.org for more information.

# Literature Award

Congratulations to Dr Awang Azman Awang Pawi from the Centre for Language Studies who won the *Hadiah Sastera Kumpulan Utusan-ExxonMobil 2008* in the category of Arts Research. The winning piece was entitled "*Prasangka Orientalis terhadap Bangsa Melayu*" published in *Jurnal Pemikir* (April - June 2008 issue), an Utusan Group publication. He received the prestigious award from Tun Dr Mahathir Mohamad on 19 June 2009 at Istana Budaya.

# RESEARCH HIGHLIGHTS

## Wood-Polymer Composites and Woody Biomass in the Twenty-first Century

**Researchers : Dr** Sinin Hamdan, Md Rezaur Rahman, Dr Md Saiful Islam, Abu Saleh Ahmed

Wood-polymer composites are materials in which wood is impregnated with liquid chemicals that then solidify in the wood. By allowing this various chemicals to fill and solidifies in the void spaces in wood, its compression strength, hardness, and abrasion resistance are greatly improved.

Wood-polymer composites are produced in various countries in the world, including the United States, Germany, England, Poland, Italy, Japan, Taiwan, and New Zealand. They are extensively used for building products, automotive, packing materials, and other applications. Hence, wood-polymer composites have become one of the most dynamic growing materials in wood industry.

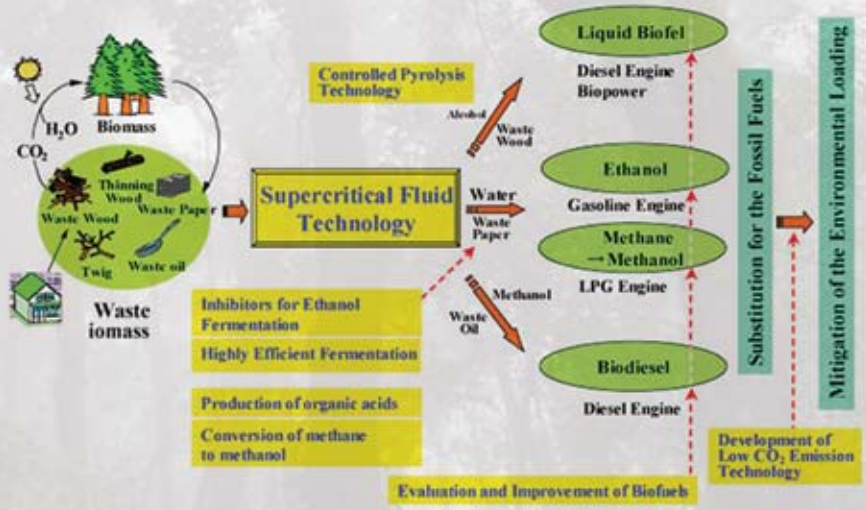
The aim of this study is to establish technologies to realize the utilization of tropical softwood species in wood polymer composites and renewable energy production in Sarawak. In this study, various tropical wood namely *Eugenia Spp* (Kelat), *Artocarpus Rigidus* (Temponek), *Artocarpus Elesticus* (Terap Nasi), *Koompassia Malaccensis* (Kempas) and *Xylopia Spp* (Bintangor) were selected.

To convert the selected woods to wood polymer composites, they were chemically treated with periodic acid (sodium meta periodate). The resultant wood-polymer composites were analysed for their structural characteristic and chemical composition, as well as strength. They were found to have an increase in strength compared to the respective raw woods; the wood-polymer composites were more resistant to bending and rupture. Among them, treated Elesticus showed the highest strength.

Analysis also showed improvement in the mechanical properties of the treated wood composites. It had a lower water content compared to its respective raw wood and had high resistance to decay exposure, with *Eugenia Spp* having the highest resistance compared to the others.

Looking into the wood potential as renewable energy source in Sarawak, studies were also conducted to convert the solid mass to liquid fuel. With the increase in global demand for fuel resources, its potential as energy resource needs to be explored as an alternative to fossil resources, since unlike fossil resources, wood is a renewable biomaterial.

In this study, the liquefaction of woody biomass was conducted by supercritical alcohol treatment to obtain liquid fuels and useful chemicals. Compared to petroleum, raw wood as fuel resources involve the handling of a material that is bulky and therefore difficult to handle, transport and stored. Therefore, conversion of this solid mass into liquid offers ample opportunities for advanced utilization.




# Modelling Large Scale Greywater Recycling

Researchers: Prof Dr F J Putuhena, Prof Dr S Salim, D Y S Mah, S H Lai

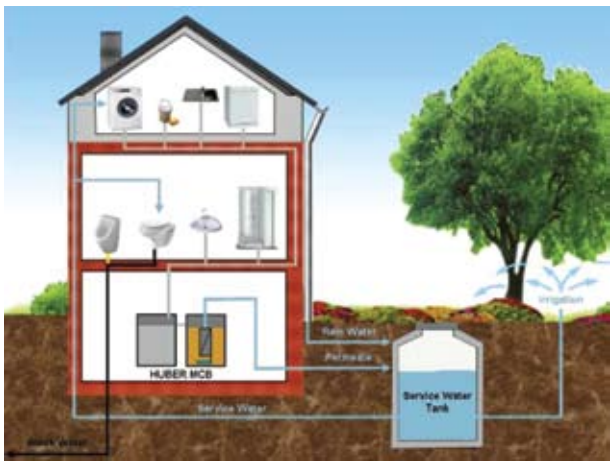
Kuching is not sewered and, as in most Malaysian houses, the greywater (water discharge from household uses such as bathing, dishwashing, and laundry) is released untreated to the storm water drains.

Since 2003, the Sarawak State Government in Malaysia has collaborated with the Danish Cooperation on Environment and Development (DANCED) to establish an Ecological Sanitation (EcoSan) pilot project for treating greywater in Kuching city. Nine households in a housing estate in Kuching were selected for the pilot project.

The philosophy of EcoSan is to reuse nutrients and water contained in "waste water" for agriculture, horticulture or wasteland greening, instead of disposing them into rivers, lakes or groundwater aquifers where they cause many environmental problems and contaminate precious fresh water resources. The pilot system implemented in Kuching, however, treats only the greywater which is then discharged into the storm water drains.

The pilot system connects to nine households of single-storey detached houses with an average of five persons per household. Greywater from the kitchen, shower and washing machine is channelled to the EcoSan facilities for treatment. The project runs under the supervision and observation of the Sarawak Natural Resources and Environmental Board (NREB). The pilot system proves to be efficient in removing 90% of organic pollutants in the greywater.

This research explores the potential of EcoSan system for greywater recycling in Kuching City on a larger scale. Since greywater is generated in every household in just about equal volumes daily, it presents a constant source of wastewater discharge which could be recycled and used for non-consumptive purposes. This could lower the cost of supplying household water as potable water meant for human consumption requires expensive treatment and storage facilities.




The potential of EcoSan system for greywater recycling in Kuching City on a larger scale was investigated through a mathematical modelling using InfoWorks WS, a software engine introduced in 1998 that integrates asset and business planning with water supply and distribution network modelling. Through the software, an average reduction of 40% was predicted for a system-wide water demand of domestic users.

At present, little regard is paid by local residents to their water usage habits. The general perception is that water is cheap and plentiful. However, in an expanding city such as Kuching, the advantages of the integrated system are too great to ignore. The EcoSan system presents a potentially ideal solution, both to improve the river water quality and reduce the cost of potable water supply.

# Biodiversity of the Kelabit Highlands of Sarawak

Researchers: Prof Dr Fatimah Abang, Indraneil Das, Ap Dr Cheksum Tawan, Prof Dr Mustapha Abd Rahman, AP Dr Andrew Alek Tuen, AP Dr Sepiah Muid, Prof Dr Mohd Tajuddin Abdullah, Charlie Laman, AP Dr Isa Ipor, AP Dr Petrus Bulan

Systematics Agenda 21 which was presented during the Earth Summit in Rio De Janeiro in 1992 called for effort towards an increase in knowledge on the Earth's biodiversity. A priority issue includes biological diversity of the flora and fauna inhabiting mountainous regions.

The Kelabit Highlands is located in the uplands of Northern Sarawak. It is unaccessible by lands and unless you are an ardent trekker, a river journey which ends with days of trekking upland is impossible. Gunung Murud, which is the highest mountain in Sarawak is part of the mountain chain of the Kelabit Highlands and because of the inaccessible nature of the Kelabit Highlands, much of the biodiversity in Gunung Murud is unknown.

A group effort was therefore mounted to evaluate the biodiversity of the Kelabit Highlands, beginning with Gunung Murud. Among the objectives is to contribute to the socio-economic planning, including conservation and management of these mountains.

Mountains in both tropical and temperate countries are especially rich in endemic species (species exclusively native to a specific area). Therefore, the study on Gunung Murud is important to establish the patterns of diversity and identify areas where endemic species are high. These are important in evaluating areas for protected status.

The Kelabit Highlands was first explored in 1922 by Eric Mjöberg (1882–1938), a Swedish naturalist and Curator of the Sarawak Museum. Articles related to the Kelabit

Highlands in the Sarawak Museum Journal came from the 1920s and many of the articles mainly focused on certain group or species of the flora and fauna. The consequent lack of study, added with the fact that montane areas act as centres of species evolution, suggest that a wealth of knowledge remain uncovered within the confines of Gunung Murud.

As suspected, Gunung Murud is rich in species biodiversity. And a large number of specimens remain unidentified due to the scarcity of previous work. A number of species

new to science and new records are anticipated as scientific classification of the flora and fauna progress. More intensive work is also planned for Gunung Murud in order to enhance the evaluation and understanding of the biodiversity of this remote highland of Sarawak.

# The Mangrove Forests of Sarawak

Researchers: Jongkar Grinang, AP Dr Lee Nyanti, Nordiana Hassan, Noor' Ain Jalim, Haryanti Seleman, Nurnadiah Moktar

Mangrove Forests occur along the coastline and within estuaries of rivers where sedimentation occurs. Mangrove Forest occupies only about 0.1 million hectares or around 1% of Sarawak's land area. Over the past 30 years, the State had lost approximately 24% of its mangrove forests to various types of land use which include oil palm plantations, aquacultures, housing estates and other development projects; as well as to feed forestry industries for firewood, poles, and charcoals production.

Sarawak's mangrove forests contributed high economic values in term of forest products, aquaculture and eco-tourism. It is estimated that Kuching mangrove forest alone contributed more than US$24 million to the State's revenue and involved about 3,000 employments. Revenues from eco-tourism industry alone, which mainly focused on its wildlife, contributed to about RM6 million per year. In aquaculture, it is predicted that pen culture of mud crab (*Sylla* spp.) in mangrove forest could generate a household income of about RM16,000 yearly.

Despite the economic importance of mangrove forest in Sarawak, study on its biological diversity is still very much lacking. Due to the lack of baseline information on the biological diversity, impacts of development projects on the organisms in the ecosystem are usually difficult to justify. This study serves as a preliminary assessment to determine the species diversity of fish and decapod crustaceans (i.e. crabs, shrimps, and prawns)

and to determine the community structure of the fauna in relation to environmental variables in the two mangrove forest in Sarawak, namely Rambungan Mangrove and Kuching Wetland National Park.

Overall, the water parameters in both mangrove areas vary according to weather (sunny and rainy days), tidal influences (low and high tides), proximity to the sea and the influences of human activities in the surrounding areas. An earlier study suggested that the water quality of both mangrove areas is slightly low with significant concentration of organic pollutants; mainly as a result of waste discharge from nearby settlements and aquaculture activities.

In total, 59 species from 35 families and 12 orders of fishes were recorded from the two mangrove areas. Forty species were recorded from Rambungan Mangrove and 39 species from Kuching Wetland National Park. Both the mangrove forests are homes to more than 30 species of decapod crustaceans including the true aquatic and semi-terrestrial species; these include 18 species from five families which include commercial shrimps (*Penaeus* spp.) and crabs (*Scylla* spp.).

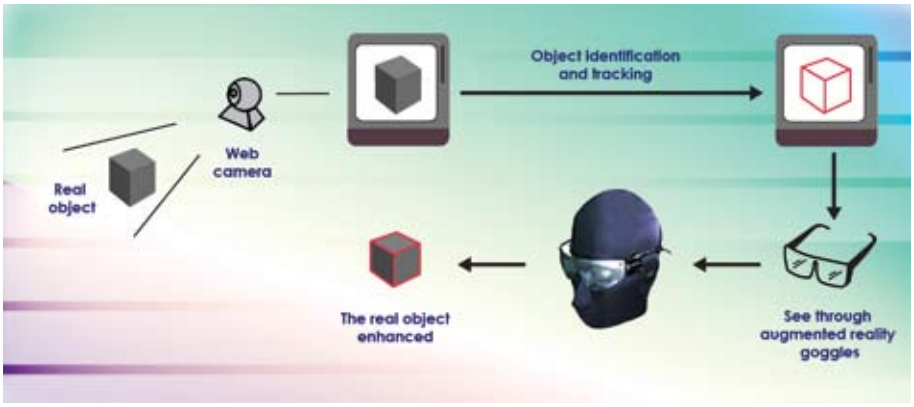
It is obvious that Kuching Wetland National Park and Rambungan Mangrove harboured a high number of fish and decapod crustacean species. However, further detailed studies should take into consideration the community of mudflat organisms and the variation in fish fauna due to tidal and seasonal influences.

# PRODUCT AND TECHNOLOGY TRANSFER

## Augmented Reality Technology to Facilitate Tourism

Researcher: Dr Edmund Ng Giap Weng

This project investigates automatic real-time translation of texts on street signs using a system designed for identifying texts on street signs, translating it into a language familiar to the user and displaying it within the user's field of view using a device such as a head-mounted display. This system is potentially useful to tourists who need to find their way in foreign countries whose language they are not familiar with.




Exploring the potential of augmented reality technology which is capable of superimposing graphics, audio and other sense enhancements from computer screens onto real time environments, the system is capable of superimposing graphics for every perspectives and adjust to every movements of the user's head and eyes. The system implemented in this pilot study focuses on a known sign and translates English texts to Malay texts. The system is currently being developed for street and road signs but would be appropriate for constrained environments such as museums.

The project was voted for the Best of Tourism and Hospitality award as the most innovative nomination for developing ICT solutions for support of the tourism and hospitality industry, at the MSC Malaysia APICTA 2008 Awards late last year.



## Supporting the Audibly-Impared

Researcher: Wang Hui Hui

Sign language is one of the most natural means of exchanging information for most of the audibly-impared. Those who are born audibly-impared or become audibly-impared very early in life are the native "speakers" of the sign language. Sometimes, for the audibly-impared, sign language is the only language that they have 100% access to.

This project focuses on developing hand gesture modeling techniques for sign language recognition and presentation. A framework for sign language computer interface design which aims at aiding the learning of sign language using computer or interacting with computer for the audibly-impared is being researched and discovered. It is hoped that the development of a prototype that will be able to model the hand gesture for accurate sign language recognition and presentation will aid the audibly-impared in their daily life communication with those who hears.

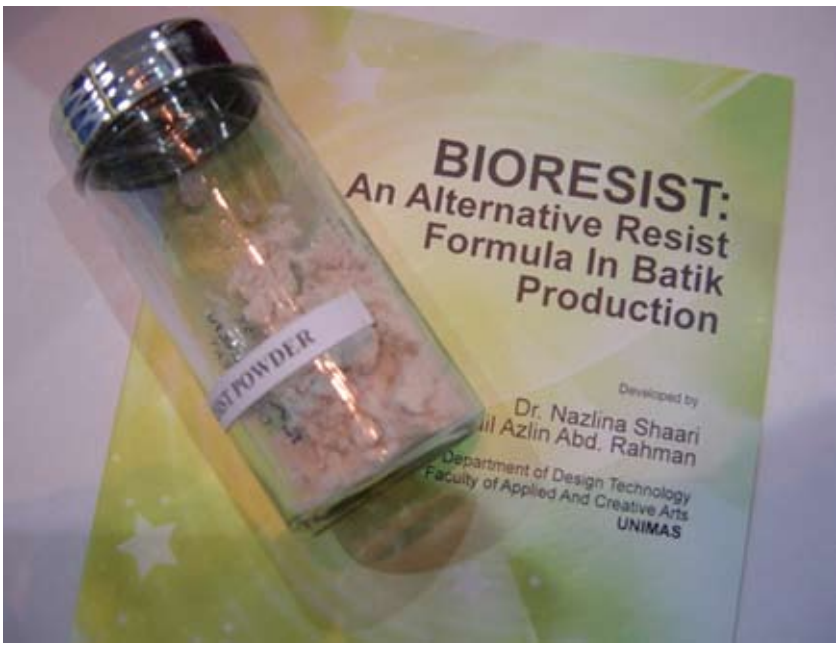
# Sago Starch for Batik Printing

Researchers: Dr Nazlina Shaari, Assoc Prof Dr Khairul Aidil Azlin b Abd Rahman

The delicate beauty of Malaysian batik belies a complex production processes which involves the use of harmful paraffin wax as paste. This not only poses serious health risks to batik designers and workers, it also leads to the production of harmful toxic waste, which is normally feed into the river.

BioPaste and BioResist is a sago-starch-based paste, which provides a safe and environment friendly alternative to the paraffin wax.

Both the products have demonstrated superior application in the various process of batik production such as the production of handdrawn or handwritten batik (Bioresist) and printed batik (Biopaste). In addition, it reduces the energy consumed during batik production and the preparation itself can be produced at a much lower cost (80% cheaper than the paraffin wax).




*This product has clinched many awards and the latest was the Silver Award at the BIOMALAYSIA 2008 for Bio-paste.*

# Finger Rehabilitation Device for Stroke Patient

Researchers: S. Mohamaddan, M.S. Osman, N.H.N. Mohamed, A.A. Alias

Stroke is the third largest cause of death in Malaysia. There are about 17,909 stroke victims reported in 2005 and the figure is expected to exceed 25,000 per year by 2020. When life is spared, post-stroke patients with upper-extremity hemiparesis (partial paralysis of one side of the body) will experience paralysis on the upper limb especially on the hand and forearm. This disability will definitely affect the patient daily routine. This requires rehabilitation activity which involved therapy to regain the range of motion as well as strengthening the motor skill for controlling the fingers movement. In many cases, the number of therapist for the rehabilitation exercise is not sufficient and the therapy can be difficult to conduct.

To counter these problems, the research group at UNIMAS is looking at a grasp mechanism assistant device which would assist in finger rehabilitation exercise for post-stroke patient, at anywhere and anytime. The device, through its motor-support mechanical mechanism, will allow the affected fingers to perform the extension and flexion movement needed in the rehabilitation activity. A prototype has been developed (*Figure 1*) and it is hoped that the project can offer an alternative rehabilitation activity for post-stroke patients.

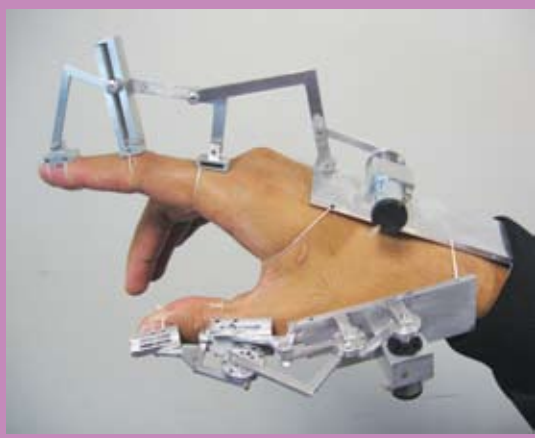


*Figure 1 Grasp Mechanism Assistant Device*

# NETWORKING

## MoA between UNIMAS and Mayo Clinic Rochester

An agreement was signed between Universiti Malaysia Sarawak (UNIMAS) and Mayo Clinic Rochester on 30 January 2009 for research on DNA plasmid containing part of the Plasmodium knowlesi small-subunit ribosomal RNA gene. The agreement was signed by Virginia M. Bruce on behalf of Mayo Clinic Rochester and Prof Dr Khairuddin Ab Hamid on behalf of UNIMAS.

The Clinical Microbiology Laboratory at Mayo Clinic is an internationally renowned reference and development laboratory with expertise in all areas of conventional and molecular microbiology. It is actively involved in developing rapid, useful diagnostic microbiologic methods, beneficial to patient care.

## The Germans in UNIMAS

A 2-day exhibition on German products and services was held in UNIMAS on 23-24 April 2009. This event was part of the German Day Festival in Kuching which carries the tagline "Germany Faces Malaysia". Among the highlights of the festival were the month-long (April 22 to May 22) '100 best posters' exhibition, business and education fair, poster design workshop, business contact dinner, German film festival and German food festival.

Among the companies that participated in the 2-day event at UNIMAS were 10 of world-class companies, such as, Mercedes Benz, Bayer, Siemens and B Braun. Four German films were screened at UNIMAS. They were 'Mostly Martha' directed by Sandra Nettelbeck, 'One day in Europe' by Hannes Stoehr, 'The wood is not enough' by Sven Unterwaldt and 'The lives of the others' by F Henckel von Donnersmarck.

## UNIMAS Zoonosis Study Collaboration

A lot has happened since the first eco-zoonosis symposium was held in UNIMAS to discuss the present knowledge and identify gaps and opportunities for research in the early 2008. At the end of 2008, Dr Hume Field of Queensland Department of Primary Industries (QDPI) agreed to assist in the planning and monitoring of set goals and objectives. He will also source for funding and monitor the progress and development of the planned research activities.

Extensive survey was conducted in mid 2008 involving 50 researchers and field staff in three ecological habitats, namely Sibu city, an oil palm plantation and a pristine forest at the Lanjak Entimau Wildlife Sanctuary. By April 2009, Dr Hume has successfully arranged for the screening of mammalian virus at the Institute Pasteur in Phnom Penh, Cambodia which is led by Dr Philippe Buchy. Meantime, Prof Dr Peter Songan, Deputy Vice Chancellor of Research and Innovation (UNIMAS), and team have initiated long term cross institutional research collaborations in eco-zoonosis with the Veterinary Research Institute of the Malaysian Ministry of Agriculture.

The Malysian Institute of Medical Research (IMR) has also agreed in principle to be involved with the UNIMAS eco-zoonosis research project, staff exchange, training and co-supervision of students.

## UNIMAS and Bournemouth University of the United Kingdom

Five third-year Bournemouth University social work students completed the final 20 days of their mandatory 100 days social work placement in various Non-Governmental Organizations in Kuching, Sarawak, under the guidance and supervision of Mr. Dolly Paul Carlo, the coordinator of Social Work Programme, Faculty of Social Sciences, UNIMAS. The work placement offers a unique cross-cultural learning opportunity for students from the UK.

In addition to this project, it is hoped that there would be research collaboration, and a staff or student exchanges.

# STAKEHOLDER SPEAKS

## The Creation and Sustainability of an Innovative Culture

**YB Tuan Haji Fadillah bin Haji Yusof**
*Deputy Minister of Science, Technology and Innovation*

During the last three decades, the term innovation has emerged as one of the key concepts for academics, economics and politics; where the main drivers in the formulation of innovation strategies are the governments and in the case of Malaysia, the National Innovation Council (NIC). Within these strategies, new innovation-based programmes which include increased funding for scientific research, knowledge-infrastructure, technology acquisition and efficient intellectual property rights regime are implemented. Here, the Government, through the Ministries and its agencies, seeks to coordinate and establish partnerships with the universities and private sectors to create a National Innovation System (NIS).

Within this system, the universities role is not only to generate and disseminate knowledge through their research and development (R&D) and education activities; but also to update the university's knowledge base with the latest industry developments and align the skills and knowledge of their students to the industry's needs. Likewise, excellent university scientific and technological innovations are built on excellent R&D activities. Based on a tri-partite partnership, universities can leverage on its "hinterland", i.e., the surrounding industries and community activities, to develop its niche and core competencies. Similarly, universities can position themselves as part of the mainstream national and local strategic planning, implementation and monitoring partners, especially in the areas of R&D and education.

The key goals pursued in innovation within the private sector are new ideas, new alliances and new markets. In a university-industry partnership, this could lead to the generation of ideas for new products, processes and services through an extensive knowledge generation activities which are matched to the market needs served by the industry. Ultimately, for this partnership to be productive and successful, the innovation value chain that runs from the laboratory to the market or vice versa, requires a "smart" collaboration and partnership between a university and the private sector. Among other issues, there must be a sense of ownership from every quarter to sustain this partnership; and that means that the strategy will have to take into account various aspects, such as, the business plans, project management responsibilities, IPR ownership and commercialisation.

However, let's not forget that critical to the above, human capital development is one of the key components in the creation and sustainability of an innovative culture where the mind-set or "culture" of the workforce must be geared towards working and living in an environment of creativity and risk-taking. It is therefore imperative for universities, whilst emphasizing on the development of scientific and technological innovations, complement its strategy by building upon the capacity and capability of their graduates. It is critical for the universities to equip their graduates with the right skills and attitudes that will make them part of the innovative workforce.

Without a doubt, universities are the key players in developing the national innovation culture; a culture which will help in the transformation and realisation of a high income and advanced nation status for Malaysia. Needless to say, this will depend on their ability to leverage on the most important asset, i.e., the human capital, and to provide a conducive environment for the development of such culture. The choice, therefore, lies with the university; whether to come on-board the ship of purpose or risk being left standing on the dock of obscurity!

# RESEARCH TOOLS & TECHNOLOGIES IN UNIMAS

## Gas Chromatography System

Gas chromatography (GC) is a common type of chromatography used in organic chemistry for separating and analysing compounds that can be vaporised without degradation. GC is normally used in testing the purity of a particular substance or separating the different components of a mixture.

GC has similar principle with column chromatography systems used in basic analytical laboratories. First, the process of separating the compounds in a mixture is carried out between a liquid stationary phase and a gas moving phase, whereas in column chromatography, the stationary phase is a solid and the moving phase is a liquid. Secondly, the column through which the gas phase passes is located in an oven where the temperature can be controlled. The concentration of a compound in the gas phase is solely a function of the vapor pressure of the gas.

The flame ionization detector (FID) and the thermal conductivity detector (TCD) are the two most common detectors in GC. Both detectors are sensitive to a wide range of components and able to work over a wide range of concentrations. Some GCs are connected to a mass spectrometer which acts as a detector. The combination is known as GC-MS. There are various applications of GC-MS such as drug detection, fire and explosives investigation, environmental analysis and identification of unknown samples.

## Inductively Coupled Plasma Mass Spectroscopy

Inductively coupled plasma mass spectroscopy (ICP-MS) combines the easy sample introduction and quick analysis of ICP technology with accurate and low detection limits of a mass spectrometer. The instrument is capable of identifying minute amount of heavy metals (trace elements) at the part per trillion level. ICP-MS has been widely used over the years to determine heavy metals contamination in drinking water, wastewater and, natural water systems. ICP-MS is applied in various fields, such as, geology and soil science, mining or metallurgy, food sciences, as well as medicine.

# SEMINARS & CONFERENCES

## ASEAN Sago Symposium 2009

The first ASEAN Sago Symposium (ASAS) will be held on 29 - 31 October 2009 at Riverside Majestic Hotel, Kuching, Sarawak, Malaysia. The symposium will be organised by the Faculty of Resource Science and Technology, UNIMAS. Sago palm (*Metroxylon spp*.) is one of the major crops that contributed significantly to the economy of ASEAN. It is capable of surviving well in the tropical lowland and peat swamp forests in South East Asia. Sago palm is considered the only crop that is capable of giving profitable and sustainable economic returns on peat swamp.

Apart from rice, sago is also an important source of starch for human consumption. The world consumption of sago starch is between 200,000 to 300,000 tons per annum and accounts for around 3% of the total world market which is dominated by corn, potato and tapioca starches. The scope of the Symposium includes everything connected to sago and sago plantation. These include Agronomy and Agriculture Sciences, Microbiology and Molecular Biology, Waste Management and Starch Utilization, Biotechnology, Economy and Social Studies, Sago Starch Chemistry and others. Conference website: http://www.frst.unimas.my/index.php?option=com_content&task=view&id=211&Itemid=456

## Konferensi Antaruniversiti Se Borneo-Kalimantan Ke-5

A regional conference by universities in Borneo was held on 6 - 17 Jun 2009 at Universiti Malaysia Sabah, Kota Kinabalu, Sabah. The conference was organised by the Institute of East Asian Studies, UNIMAS together with a few other institutions in Borneo. The theme of the 2009 conference is ”Social Transformation in Borneo-Kalimantan: Modernisation Experiences.”

## The Second e-Bario Knowledge Fair

This meeting will be conducted on 4 - 6 November 2009 at Bario, the Kelabit Highlands of Sarawak, East Malaysia. The fair will be organised by the Centre of Excellence for Rural Informatics (COERI), UNIMAS. Conference themes include the emerging fields of cultural heritage research and ICT, Human Computer Interaction (HCI), diversity of use, local modification and creativity of ICT for development, knowledge management and social transformation, Information Communication Technology for development, and Social Shaping of Technologies. Log on to http://coeri.unimas.my for further details.

## Conference on Natural Resources in the TROPICS 2009

The 3rd Conference on Natural Resources in the Tropics (NRTrop3_2009) was organised from 3-5 August 2009 at Hilton Hotel, Kuching, Sarawak by the Faculty of Resource Sciences and Technology, UNIMAS. The theme for the conference was “Harnessing Tropical Natural Resources through Innovations and Technologies”.

The objectives of the conference were to explore, exchange and update scientific and technological findings and information related to tropical natural resources. It was also a forum for researchers, practitioners and stakeholders of tropical natural resources to present their findings, state-of-the-art technologies, products and services.

# PUBLICATIONS

Affan, M. A., Fasihuddin, B. A, Liew,Y. Z and Ismail, J. (2009). Synthesis, spectroscopic characterization and antimicrobial activity of organotin(IV) complexes containing hydrazone ligand: X-ray single crystal structure of [*n*-$Bu_2Sn(H_2PAI).H_2O$]. *Journal of Scientific Research,* 1 (2), 306-316.

Affan, M. A., Foo, I. P. P and Fasihuddin B. A. (2008). Synthesis and structural characterization of organotin(IV) complexes with pyruvic acid-4-hydroxybenzhydrazone ($H_4PDB$): X-ray crystal structure of [$nBu_2Sn(H_2PDB)$]. *ACGC Chemical Research Communications*, 22: 4-10.

Affan, M. A., Foo, S. W., Ngaini, Z and Mustaffa, B. S. (2008). Synthesis and characterization of novel diorganotin(IV) complexes derived from *N*'-benzoyl-hydrazinoacetic acid methyl ester: X-ray crystal structure of [$Ph_2Sn(MPB)$] *ACGC Chemical Research Communications*, 22: 11-15

Ahmad Zubaidi Baharumshah, Venus Khim-Sen Liew and Chan Tze-Haw. (2009). Real interest rate differential: International evidence based on nonlinear unit root tests. *Bulletin of Economics Research*, 61 (1): 83-94.

Baini, R. & Langrish, T.A.G. (2009). Assessment of colour development in dried bananas - measurements and implications for modeling. *Journal of Food Engineering*, Elsevier, 93 (2): 177-182.

Bronner, U., Divis, P.C.S., Farnert, A. & Singh, B. (2009). Swedish traveller with *Plasmodium knowlesi* malaria after visiting Malaysian Borneo *Malaria Journal*, 8:15.

Chia, S.W., and Sim, E.U.H. (2009). Expression of *Periostin* and identification of *Periostin*-isoforms in colorectal carcinoma. *Malaysian Journal of Science, 28* (1):15-23.

Evan Lau and Ahmad Zubaidi Baharumshah. (2009). Assessing the mean reversion behavior of Fiscal policy: The perspective of Asian Countries *Applied Economics*, 41 (15): 1939 – 1949.

Hock-Ann Lee and Kian-Ping Lim and Venus Khim-Sen Liew. (2009). Is there any international diversification benefits in ASEAN stock markets?, *Economics Bulletin*, 29 (1): 393-407.

Hameed, B.H., Tan, I.A.W. & Ahmad, A.L. (2009). Preparation of oil palm empty fruit bunch-based activated carbon for removal of 2,4,6-trichlorophenol: Optimization using response surface methodology. *Journal of Hazardous Materials,* Elsevier, 164 (2-3):1316-1324.

Martin J., & Ling How Kee. (2008). International activity through student mobility: Physical, psychological and social adjustment. *International Journal of Learning*, 15 (8): 229-234.

Khan, S., Kulathuramaiyer, N., Maurer, H. (2008). Application of Mashup for a digital journal. Journal of Universal Computer Science, 14 (10): 1695-1716

Kho, F. W. L., Law, P. L., Lai, S. H., Oon, Y. W., Ngu, L. H. & Ting, H. S. (2009). Quantitative dam break analysis on a reservoir earth dam. *International Journal of Environmental Science and Technology*, 6 (2): 203-210

Kolay, P. K. & Kismoor, T. (2009). Geotechnical characterization of coal ashes from Sarawak for bulk utilization. *The Journal of Solid Waste Technology and Management,* 35 (2): 78-87.

Lee, K-S., Cox-Singh, J. & Singh, B. (2009). Morphological features and differential counts of *Plasmodium knowlesi* parasites in naturally acquired human infections. *Malaria Journal*, 8: 73.

Lim, S. F., Zheng, Y. M, Zou, S. W. & Chen, J.P. (2009). Uptake of Arsenate by an Alginate-Encapsulated Magnetic Sorbent: Process Performance and Characterization of Adsorption Chemistry. *Journal of Colloid and Interface Science*, 333 (1): 33-39.

Lim, S. F., Zheng, Y. M. & Chen, J. P. (2009). Organic Arsenic Adsorption onto a Magnetic Sorbent. *Langmuir the ACS Journal of Surfaces and Colloids*, 25 (9): 4973-4978.

Mah, D.Y.S., Bong, C.H.J., Putuhena, F.J. & Said, S. (2009). A conceptual modeling of ecological greywater recycling system in Kuching City, Sarawak, Malaysia. *Resources, Recycling and Conservation,* 53 (3): 113-121.

Narayanan, K., Sim, E.U.H., Ravin, N.V., and Lee, C.W. (2009). Recombination between linear double-stranded DNA substrates *in vivo*. *Analytical Biochemistry,* 387: 139-141.

Ramayah, T., Ahmad, N. H., Lau, G. C., & Lo, M. C. (2009). Testing a causal model of Internet piracy behavior among university students. *European Journal of Scientific Research,* 29 (2): 206-214.

Rigit, A.R.H. & Shrimpton, J.S. (2009). Estimation of the diameter–charge distribution in polydisperse electrically charged sprays of electrically insulating liquids. *Experiments in Fluids,* Springer Berlin/ Heidelberg, 46 (6): 1159-1171.

Seng, D.M., Putuhena, F.J., Said, S. & Ling, L.P. (2009). A study of ecological sanitation as an integrated urban water supply system: Case study of sustainable strategy for Kuching City, Sarawak, Malaysia. *Journal of Water and Health*, IWA Publishing, 7 (1): 169–184.

Singh, H. & Kolay, P. K. (2009). Analysis of coal ash for trace elements and their geo-environmental implications. *Water Air and Soil Pollution,* 198 (1-4): 87-94.

Seneviratne, H.N., Rajapakse, M.P.N. & Gunaratne, M. (2009). Field calibration of an analytical model for pavement friction testing applications. *Journal of Testing and Evaluation*, 37 (1): 21-30.

Stanley Bye Kadam Kiai. (2008). Rubber and the modernisation of the Sarawak Museum Journal. The Sarawak Museum Journal, LXV (86).

Tan, I.A.W., Ahmad, A.L. & Hameed, B.H. (2009). Fixed-bed adsorption performance of oil palm shell-based activated carbon for removal of 2,4,6-trichlorophenol. *Bioresource Technology,* 100 (3): 1494-1496.

Tan, I.A.W., Ahmad, A.L. & Hameed, B.H. (2009). Adsorption isotherms, kinetics, thermodynamics and desorption studies of 2,4,6-trichlorophenol on oil palm empty fruit bunch-based activated carbon. *Journal of Hazardous Materials,* 164 (2-3): 473-482.

Then, D. C. O., & Ting, S. H. (2009). Preliminary study of code-switching in English and Science secondary school classrooms in Malaysia. Teaching of English as a Second or Foreign Language (TESL-Electronic Journal), 13(1), A3. Available at http://tesl-ej.org/ej49/a3.html

T.K. Jayaraman and Evan Lau (2009). Does external debt lead to economic growth in Pacific Island countries? An empirical study. Journal of Policy Modeling, 31 (2): 272 – 288

Ting, S. H., & Kho, T. P. (2009). Gender and communication strategy use in learning English as a Second Language. *International Journal of Applied Linguistics,* 157: 193-208.

Ting, S. H., Siti Marina Kamil, Ho, A. P., Ahmed Shamsul Bahri b Mohamad Tuah & Campbell, Y. M. (2009). Learning English for Social Purposes (2nd ed.). Shah Alam, Malaysia: McGraw Hill. 152 pp.

Venus Khim-Sen Liew, Hock-Ann Lee and Kian-Ping Lim. (2009). Purchasing power parity in Asian economies: Further evidence from rank tests for cointegration. *Applied Economics Letters*, 16, 51 – 54.

Venus Khim-Sen Liew. (2009). Linear and nonlinear monetary approaches to the exchange rate of the Philippines peso-Japanese yen. *Economics Bulletin*, 29 (2): 1331 - 1440.

# RESEARCH CONTACTS

The following are contact emails and telephone extensions (082-581000 through operator; or 082-58 followed by the extension number for direct dialing) of officials/researchers in-charge of various research disciplines at UNIMAS.

## Vice Chancellor

Prof Dr Khairuddin Ab Hamid
khair@cans.unimas.my (ext: 1111)

## Deputy VC (Research & Innovation)

Prof Dr Peter Songan
songan@cans.unimas.my (ext: 1122)

## Faculty of Resource Science & Tecnology

Prof Dr Shabdin Mohd Long
lshabdin@frst.unimas.my (ext: 3180)

1. Molecular Biology
   Assoc Prof Dr Edmund Sim Ui Hang
   uhsim@frst.unimas.my (ext: 3185)

2. Plant Science and Environmental Ecology
   Assoc Prof Dr Sepiah Muid
   msepiah@frst.unimas.my (ext: 2949)

3. Zoology
   Dr Yuzine b Esa
   eyuzine@frst.unimas.my (ext: 2988)

4. Chemistry
   Assoc Prof Dr Zaini @ Zani Assim
   zaini@frst.unimas.my (ext:3026)

5. Aquatic Science
   Dr Samsur Mohamad
   msamsur@frst.unimas.my (ext: 2941)

## Institut of Biodiversity & Environmental Conservation

Assoc Prof Dr Andrew Alex Tuen
aatuen@ibec.unimas.my (ext: 2295)

## Faculty of Computer Science & Information Technology

Prof Dr Narayanan Kulathuramaiyer
nara@fit.unimas.my (ext:3767)

1. Computational Science and Matemathics
   Dr Shapiee Abdul Rahman
   sar@fit.unimas.my (ext:3664)

2. Computing and software Enginering
   Dr Edwin Mit
   edwin@fit.unimas.my (ext:3636)

3. Computer System & Communication Technology
   Assoc Prof Dr Tan Chong Eng
   cetan@fit.unimas.my (ext: 3776)

4. Information System
   Sharin Hazlin Huspi
   hshazlin@fit.unimas.my (ext: 3772)

## Faculty of Engineering

Prof Dr Wan Hashim Wan Ibrahim
wiwhashim@feng.unimas.my (ext: 3325)

1. Mechanical Engineering
   Syed Tarmizi Syed Shazali
   starmizi@feng.unimas.my (ext: 3268)

2. Civil Enginering
   Dr Siti Noor Linda Taib
   tlinda@feng.unimas.my (ext: 3337)

3. Electronics Engineering
   Dr Wan Azlan Wan Zainal Abidin
   wzaazlan@feng.unimas.my (ext: 3339)

4. Chemical Engineering
   Dr Rubiyah Hj Baini
   rubiy@feng.unimas.my (ext: 3338)

## Faculty of Medicine & Health Sciences

Tan Sri Datu Prof Dr Mohd Taha Arif
amtaha@fmhs.unimas.my (082 292111)

1. Surgery
   Assoc Prof Dr Tin Win
   wtin@fmhs.unimas.my (082 292207)

2. Medicine
   Dr Ye Nyunt
   yenyunt@fmhs.unimas.my (082 292211)

3. Paraclinical Science
   Dominic Dado Sagin
   dsagin@fmhs.unimas.my (082 292250)

4. Basic Medical Science
   Dr Muna Sabri
   smuna@fmhs.unimas.my (082 292241)

5. Orthopedics
   Dr Chan Wai Hong
   whchan@fmhs.unimas.my (082 292257)

6. Peadiatrics
   Dr Mohamaed Ameenudeen B.A Sultan Abdul Kadera
   kmameenudeen@fmhs.unimas.my (082 292259)

7. Obstetric & Gynaecology
   Dr Awi ak Idi
   iawi@fhmhs.unimas.my (082 292263)

8. Community Medicine and Public Health
   Assoc Prof Dr Kamaluddin Bakar
   bkamaludding@fmhs.unimas.my (082 292382)

9. Nursing
   Jane Buncuan
   jbuncuan@fmhs.unimas.my (082 292284)

10. Ophthalmology
    Prof Dr Chua Chung Nen
    cnchu@fmhs.unimas.my (082 292221)

11. Psychological Medicine
Prof Dr Mohd Fadzillah Abd Razak
armfadzillah@fmhs.unimas.my (082 292113)

12. Family Medicine
Dr Lee Ping Yien
bylee@fmhs.unimas.my (082 292247)

13. Radiology
Dr Ahmad Faizal b Mohammad Ali
maafaizal@fmhs.unimas.my (082 292270)

14. Pathology
Assoc Prof Dr Lela Suut
slela@fmhs.unimas.my (082 292269)

## Faculty of Applied & Creative Arts

Dr Hasnizam bin Abdul Wahid
awnizam@faca.unimas.my (ext:1436)

1. Design Technology
Dr Nazlina Shaari
snazlina@faca.unimas.my (ext: 1343)

2. Visual Art and Technology
Zulkalnain Zainal Abidin
nine@faca.unimas.my (ext: 1342)

3. Performing Arts and Production Technology
Abdul Riezal Dim
driezal@faca.unimas.my (ext: 1344)

4. Liberal Arts
Qistina Donna Juleng Lee
idjuleng@faca.unimas.my (ext:1321)

## Faculty of Cognitive Sciences & Human Development

Dr Shahren Ahmad Zaidi Adruce
azshahren@fcs.unimas.my (ext: 1569)

1. Cognitive Science
Dr Norazila Abdul Aziz
anora@fcs.unimas.my (ext: 1518)

2. Human Resource Development
Dayang Nailul Munna Abang Abdullah
aanailul@fcs.unimas.my (ext: 1555)

3. Counselling
Edris Aden
aedris@fcs.unimas.my (ext: 1545)

## Faculty of Economics & Business

Prof Dr Shazali Abu Mansur
mshazali@feb.unimas.my (ext: 2280)

1. Economic
Prof Dr Ahmad bin Shuib
shahmad@feb.unimas.my (ext: 2428)

2. Business
Prof Dr Abu Hassan bin Md Isa
miahassan@feb.unimas.my (ext: 2356)

## Faculty of Social Sciences

Assoc Prof Dr Spencer Empading Sanggin
spencer@fss.unimas.my (ext: 2255)

1. Sociology and Anthropology
Zamri Hassan
hzamri@fss.unimas.my (ext: 1973)

2. Politics and International Relation
Dr Neilson Ilan Mersat
mnilan@fss.unimas.my (ext: 2245)

3. Development Studies
Mohd Suhaidi Salleh
smsuhaidi@fss.unimas.my (ext: 1979)

4. Communication Studies
Dr Jeniri Amir
jamir@fss.unimas.my (ext: 2365)

## Institute of Community Health & Medicine

Prof Dr Mary Jane Cardosa
jcardosa@ihcm.unimas.my (ext: 2347)

## Institute of East Asian Studies

Prof Datuk Dr Abdul Rashid Abdullah
ara@ieas.unimas.my (ext: 2464)

## Institute of Biodiversity and Environmental Conservation

Assoc Prof Dr Andrew Alek Tuen
aatuen@ibec.unimas.my (ext: 2997)

## Centre for Language Studies

Dr Soubakeavathi Rethinasamy
rsouba@cls.unimas.my (ext: 1749)

## Centre for Water Research

Prof Dr Lau Seng
lauseng@frst.unimas.my (ext: 3191)

## Malaria Research Centre

Prof Dr Balbir Singh
bsingh@fmhs.unimas.my (082 292256)

## Centre for Rural Informatics

Assoc Prof Dr Alvin Yeo
alvin@fit.unimas.my (ext: 3765)

## Centre for Image Analysis & Spatial Technologies

Prof Dr Wang Yin Chai
ycwang@fit.unimas.my (ext: 3796)

## Centre for Renewable Energy

Dr Azhaili b Baharun
bazhaili@feng.unimas.my (ext: 3267)

## Centre for Semantic Technology & Augmented Reality

Dr Edmund Ng Giap Weng
gwng@fcs.unimas.my (ext: 1491)

Publication Division, Universiti Malaysia Sarawak, 94300 Kota Samarahan
Tel : + 6082 581158 Fax : + 6082 1919